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PEARL COHEN ZEDEK LATZER, LLP
10 Rockefeller Plaza, Suite 1001
New York, NY 10020

In re Application of :
PIPKO, Gregory *et al* :
Application No.: 10/526,502 :
PCT No.: PCT/IL03/00717 :
Int. Filing Date: 01 September 2003 : **DECISION**
Priority Date: 04 September 2002 :
Attorney's Docket No.: P-7083-US :
For: FUNGICIDE COMPOSITION :
CONTAINING TEA TREE OIL :

This application is before the Office of PCT Legal Administration for matters arising under 35 U.S.C. 371.

BACKGROUND

On 19 October 2004, an express request to begin national examination procedures under 35 U.S.C. 371(f) was filed for PCT/IL03/00717. The request was accompanied by, *inter alia*, an executed declaration and the basic national fee.

On 04 March 2005, counsel filed a duplicate national stage application for PCT/IL03/00717 using attorney docket number P-7083-US. This application was given U.S. application number 10/526,502.

On 24 March 2005, counsel filed an "Express Abandonment Under 37 CFR 1.138" (Form PTO/SB/24) for U.S. application number 10/526,502 filed under attorney docket number P-7083-US.

DISCUSSION

Petition for Express Abandonment

Mr. Leve has no authority to expressly abandon the national stage application filed under attorney docket number P-7083-US. There was no declaration or power of attorney filed for this application.

Two Sets of Papers to Enter National Stage

As is evident from the above recited facts, two sets of papers to enter the national stage were submitted for international application PCT/IL03/00717. The end result for an international application designating the United States of America is a

single U.S. national stage application. Therefore, the submission of two sets of national stage papers to enter the United States was improper.

The submission filed 19 October 2004 contained an executed declaration in compliance with 37 CFR 1.497(a) and (b).

CONCLUSION

For the reason discussed above, applicants' request to expressly abandon the above-captioned application under 37 CFR 1.138 is **DISMISSED**.

Applicants are advised that the above-captioned national stage application **10/526,502** is no longer a valid U.S. National stage application. The papers filed 04 March 2005 will be merged into the prior national stage application for PCT/IL03/00717. The $450.00 in fees paid in U.S. application No. 10/526,502 have been credited back to Deposit Account No. 50-3355.

Any further correspondence with respect to this matter deposited with the United States Postal Service should be addressed to the Mail Stop PCT, Commissioner for Patents, Office of PCT Legal Administration, P.O. Box 1450, Alexandria, Virginia 22313-1450, with the contents of the letter marked to the attention of the Office of PCT Legal Administration.

This application is being forwarded to the National Stage Processing Division of the Office of PCT Operations for continued processing.

James Thomson
Attorney Advisor
Office of PCT Legal Administration

Tel.: (571) 272-3302

cc: Daniel J. Swirsky
AlphaPatent Associates Ltd.
P.O.B. 2345
Beit Shemesh, ISRAEL 99544

FACSIMILE
MAIN OFFICE

Date:	March 24, 2005
To:	Terry Johnson-Vessels
Company:	United States Patent and Trademark Office P/PCT
From:	Guy Levy
Docket No.:	P-7083-US
US Serial No:	National Phase of PCT/IL03/000717
Title:	FUNGICIDE COMPOSITION CONTAINING TEA TREE OIL
Fax No.:	703-746-6630
# of Pages:	

Message:

Dear Ms. Vessels:

Further to our teleconference of March 23, 2005, please find attached the Petition for Express Abandonment under 37 CFR 1.138 as discussed.

Yours sincerely,

Guy Levy

Pearl Cohen Zedek Latzer, LLP
10 Rockefeller Plaza, Suite 1001
New York, New York 10020
Tel: (212) 632-3480
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Adjustment Date: 04/26/2005 CSMOOI
03/11/2005 MKAYPAGH 00000162 503355 10526502
03 FC:2633 100.00 CR

Adjustment Date: 04/26/2005 CSMOOI
03/11/2005 MKAYPAGH 00000162 503355 10526502
02 FC:2642 200.00 CR

Adjustment Date: 04/26/2005 CSMOOI
03/11/2005 MKAYPAGH 00000162 503355 10526502
01 FC:2631 150.00 CR

PTO/SB/24 (06-04)
Approved for use through 07/31/2006. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

EXPRESS ABANDONMENT UNDER 37 CFR 1.138

Fax directly to the Pre-Grant Publication Division at (703) 305-8568; or mail to: Mail Stop Express Abandonment
Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450

Application Number	PCT/IL03/00078
Filing Date	3/4/05
First Named Inventor	PIPCO, GREGORY
Art Unit	
Examiner Name	
Attorney Docket Number	P-7083-US

Please check only one of boxes 1 or 2 below:
(If no box is checked, this paper will be treated as a request for express abandonment as of the filing date of this paper.)

1. [X] **Express Abandonment**
I request that the above-identified application be expressly abandoned as of the filing date of this paper.

2. [ ] **Express Abandonment in Favor of a Continuing Application**
I request that the above-identified application be expressly abandoned as of the filing date accorded the continuing application filed previously or herewith.

NOTE: A paper requesting express abandonment of an application is not effective unless and until an appropriate USPTO official recognizes and acts on the paper. See the Manual of Patent Examining Procedure (MPEP), section 711.01.

TO AVOID PUBLICATION, PLEASE USE FORM PTO/SB/24A INSTEAD OF THIS FORM.

I am the:

[ ] applicant.

[ ] assignee of record of the entire interest. See 37 CFR 3.71. Statement under 37 CFR 3.73(b) is enclosed. (Form PTO/SB/96)

[X] attorney or agent of record. Registration Number 55,376

[ ] attorney or agent acting under 37 CFR 1.34 (may act under 37 CFR 1.34 only if box 2 above, stating that the application is expressly abandoned in favor of a continuing application, is checked). Attorney or agent registration number if acting under 37 CFR 1.34. _____
(Attorney or agent registration number)

Guy Levi
Signature

3/24/05
Date

GUY LEVI
Typed or printed name

212-632-3570
Telephone Number

Note: Signature of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below.

[ ] Total of _____ forms are submitted.

PATENT APPLICATION SERIAL NO. _____

U.S. DEPARTMENT OF COMMERCE
PATENT AND TRADEMARK OFFICE
FEE RECORD SHEET

03 FC:2633 100.00 CR

02 FC:2642 200.00 CR

Adjustment date: 04/26/2005 CSMOOT
03/11/2005 MKAYPAGH 00000162 503355 10526502
01 FC:2631 150.00 CR

03/11/2005 MKAYPAGH 00000162 503355 10526502

01 FC:2631 150.00 DA
02 FC:2642 200.00 DA
03 FC:2633 100.00 DA

PTO-1556
(5/87)

*U.S. Government Printing Office: 2002 — 489-267/69033

PTO-1390 (Rev. 02-2005)
Approved for use through 3/31/2007. OMB 0651-0021
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371

ATTORNEY'S DOCKET NUMBER	
P-7083-US	
U.S. APPLICATION NO. (If known, see 37 CFR 1.5)	10/526502

INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/IL03/00717	September 1, 2003	September 4, 2002

TITLE OF INVENTION **FUNGICIDE COMPOSITION CONTAINING TEA TREE OIL**

APPLICANT(S) FOR DO/EO/US **PIPKO, Gregory NEIFELD et a.**

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This is an express request to promptly begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (21) indicated below.
4. ☐ The US has been elected (PCT Article 31).
5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
   a. ☒ is attached hereto (required only if not communicated by the International Bureau).
   b. ☐ has been communicated by the International Bureau.
   c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☐ An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)).
   a. ☐ is attached hereto.
   b. ☐ has been previously submitted under 35 U.S.C. 154(d)(4).
7. ☐ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3)).
   a. ☐ are attached hereto (required only if not communicated by the International Bureau).
   b. ☐ have been communicated by the International Bureau.
   c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
   d. ☐ have not been made and will not be made.
8. ☐ An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☐ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☐ An English language translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11 to 20 below concern document(s) or information included:

11. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☒ A Preliminary Amendment.
14. ☐ An Application Data Sheet under 37 CFR 1.76.
15. ☐ A substitute specification.
16. ☐ A power of attorney and/or change of address letter.
17. ☐ A computer-readable form of the sequence listing in accordance with PCT Rule 13*ter*.2 and 35 U.S.C. 1.821 - 1.825.
18. ☐ A second copy of the published international application under 35 U.S.C. 154(d)(4).
19. ☐ A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).
20. ☒ Other items or information: 1) Postcard

U.S. APPLICATION NO. (If known, see 37 CFR 1.5)	INTERNATIONAL APPLICATION NO.	ATTORNEY'S DOCKET NUMBER
10526502	PCT/IL03/00717	P-7083-US

The following fees are submitted:			
☒ 21. Basic National Fee	$300.00	$ 300.00	
☒ 22. Examination Fee			
If International Preliminary Examination Report was prepared by the USPTO and all claims satisfy provisions of PCT Article 33(1)-(4)	$100.00	$ 200.00	
All other situations	$200.00		
☒ 23. Search Fee			
Search fee (37 CFR 1.445(a)(2)) has been paid on the International Application to the USPTO as an International Search Authority	$100.00		
International Search Report not prepared by USPTO but provided with application	$400.00	$ 400.00	
All other situations	$500.00		
Total of Above Calculations 21, 22, and 23:		$ 900.00	

☐ Additional fee for specification and drawings filed in paper over 100 sheets (excluding sequence listing or computer program listing filed in an electronic medium). The fee is $250 for each addition 50 sheets of paper or fraction thereof.

Total Sheets	Extra Sheets	Number of each additional 50 or fraction thereof (round up to a whole number)	Rate	
- 100	/ 50		x $250.00	$

Surcharge of $130.00 for furnishing the oath or declaration later than 30 months from the earliest claimed priority date (37 CFR 1.492(e)). $

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE	
Total claims	- 20 =		x $50.00	$
Independent claims	- 3 =		x $200.00	$
MULTIPLE DEPENDENT CLAIM(S) (if applicable)			+ $360.00	$

TOTAL OF ABOVE CALCULATIONS =	$ 900.00
☒ Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above are reduced by ½.	$ 450.00
SUBTOTAL =	$ 450.00
Processing fee of $130.00 for furnishing the English translation later than 30 months from the earliest claimed priority date (37 CFR 1.492(f)). +	$
TOTAL NATIONAL FEE =	$
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). $40.00 per property +	$
TOTAL FEES ENCLOSED =	$ 450.00
Amount to be Charged:	$

a. ☐ A check in the amount of $ to cover the above fees is enclosed.

b. ☒ Please charge my Deposit Account No. **50-3355** in the amount of $450.00 to cover the above fees. A duplicate copy of this sheet is enclosed.

c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. **50-3355**. A duplicate copy of this sheet is enclosed.

d. ☐ Fees are to be charged to a credit card. **WARNING:** Information on this form may become public. **Credit card information should not be included on this form.** Provide credit card information and authorization on PTO-2038.

Note: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO: **Customer Number 49443**

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SIGNATURE:
Guy Levi
NAME
55,376
REGISTRATION NUMBER
04 March 2005
DATE

Attorney Docket No.: P-7083-US

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s):	PIPKO, Gregory	Examiner:	TBD
Serial No.:		Group Art Unit:	TBD
Filed:	Herewith		
Title:	A NON PHYTOTOXIC BIOCIDE COMPOSITION CONTAINING TEA TREE OIL		

PRELIMINARY AMENDMENT

Mail Stop Non-Fee Amendment
Commissioner for Patents
P. O. Box 1450
Alexandria, VA 22313-1450

Sir:

Prior to Examination, kindly amend the above-identified application as follows:

Amendments to the Specification begin on page 2 of this Amendment.

Amendments to the Claims are reflected in the listing of claims which begins on page 3 of this paper.

Remarks/Arguments begin on page 5 of this paper.

AMENDMENTS TO SPECIFICATION

In the Specification:

On page 1, line 3, please insert the following:

--CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a National Phase Application of PCT International Application No. **PCT/IL2003/000717**, International Filing Date **1 September 2003**, claiming priority of Patent Application **IL151594**, filed **4 Sptember 2002**.--

AMENDMENTS TO THE CLAIMS

Please add or amend the claims to read as follows, and cancel without prejudice or disclaimer to resubmission in a divisional or continuation application claim 10 indicated as cancelled:

1. (Original) A fungicidal emulsion comprising tea tree oil and a water emulsion wherein the emulsifier is a water solution of a reaction product of high molecular weight organic fatty acid and an alkali or ammonium compound.
2. (Amended) The emulsion according to claim 1, ~~additionally~~ wherein said emlsion further comprises ~~comprising~~ an etheric oil.
3. (Amended) The emulsion according to claim 2, wherein ~~additional~~ said etheric oil is ~~selected among~~ lavender oil, pine oil, manuka oil, kanuka oil, eucalyptus oil, bergamot oil, clove oil, lemon oil, lemon grass oil, rosemary oil, or geranium oil.
4. (Amended) The emulsion according to claim ~~any of claims~~ 1[-3], wherein the concentration of said tea tree oil is between 0.01% [up to] and 10%.
5. (Amended) The emulsion according to claim 4, wherein the concentration of said tea tree oil is between 0.01% [to] and 1.5%.
6. (Amended) The emulsion according to ~~claims 4 or~~ claim 5, ~~wherein the concentration of the tea tree oil is between 0.1 to 1.5%,~~ wherein the concentration of the product is 0.1% to 1% and further wherein the remainder [being] is water.
7. (Amended) The emulsion according to claim ~~any of claims~~ 1 [to 6] wherein said [the] alkali ~~and ammonium~~ compounds are ~~selected among~~ sodium or potassium and[/or] said ammonium compounds are ammonium hydroxides, carbonates, bicarbonates or [any] mixtures thereof.
8. (Amended) The emulsion according to claim ~~any of claims~~ 2 [to 7], wherein the concentration of said ~~the additional~~ etheric oil is between 0.01% to 5%.
9. (Amended) The emulsion according to claim ~~any of claims~~ 1 [to 8], wherein [the] said high molecular weight fatty acid is ~~selected among~~ a. tall oil acids, naftenic acid, rosin acids [and] or any mixture thereof; b. saturated fatty acid selected [among] from lauric

acid, myristic acid, palmitic acid, stearic acid, ~~arahinoic~~ arachidonic acid, ~~behenic~~ behemic acid, lingocerinic acid or any mixture thereof; and c. unsaturated fatty acid selected [among] from ~~decenoic~~ decaenoic acid, ~~dodeceneoic~~ dodecaenoic acid, ~~palmitinoleic~~ palmitoleic acid, oleic acid, ~~lonoleic~~ linoleic acid, undecelenic acid, sorbic acid recinoleic acid or [any] mixture thereof.

10. (Cancelled) The emulsion according to claim 1, substantially as herein described with reference to the examples.

REMARKS

Applicants request entry of the Preliminary Amendment.

Applicants have cancelled claim 10 without prejudice or disclaimer. The subject Application is a national phase application of PCT Patent Application No. PCT/IL2003/000717, filed 1 Sept. 2003. Claim 1 corresponds to originally filed claim 1 of the parent application.

Should the Examiner have any question or comment as to the form, content or entry of this Amendment, the Examiner is requested to contact the undersigned at the telephone number below.

If any fee is due, the undersigned hereby authorizes the United States Patent and Trademark Office to charge the fees to Deposit Account 50-3355.

Respectfully submitted,

Guy Levi
Attorney for Applicant(s)
Registration No. 55,376

Dated: March 4, 2005

Pearl Cohen Zedek Latzer, LLP
10 Rockefeller Plaza, Suite 1001
New York, New York 10020
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(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
18 March 2004 (18.03.2004)

PCT

(10) International Publication Number
WO 2004/021792 A1

(51) International Patent Classification[7]: A01N 65/00

(21) International Application Number:
PCT/IL2003/000717

(22) International Filing Date:
1 September 2003 (01.09.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
151594 4 September 2002 (04.09.2002) IL

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(81) Designated States *(national)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States *(regional)*: ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:
— *with international search report*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

WO 2004/021792 A1

(54) Title: FUNGICIDE COMPOSITION CONTAINING TEA TREE OIL

(57) Abstract: A novel fungicidal emulsion is presented. This emulsion comprising tea tree essential oil and a water emulsion wherein the emulsifier is a water solution of a reaction product of a high molecular weight organic fatty acid and an alkali or ammonium compound.

FUNGICIDE COMPOSITION CONTAINING TEA TREE OIL

FIELD OF THE INVENTION

The present invention generally relates fungicide composition containing teat tree oil (hereinafter TTO) and more specifically to an etheric oil emulsion obtained from the tea tree, especially adapted for the control of wide range of fungal plant pathogens.

BACKGROUND OF THE INVENTION

Increasing intensive agriculture favors the epidemic development of many new and previously unknown plant pests. This development has in turn necessarily led to the use of increasing dosage of chemicals, which negatively affects environmental health. On the other hand, registered pesticides are not always available to control pests effectively and reliably, Therefore, health and environmental considerations dictate the need for alternative method of pest control, which can be promoted as possible strategies for inclusions in an Integrated Pest Management program. This program is a combination of crop protection practice, designed to maintain pests below a designated economic threshold; these practice fall into the categories of chemical; cultural and host-plant resistance.

The control and treatment of plant diseases in green houses and field-grown horticultural corps is a serious problem in agriculture. So far powdering or spraying compositions of mineral source, e.g., sulfur, cuprous hydroxide, calcium polysulfate etc. or compositions based on detergents or oils have been mainly used. However, the use of said compositions is very unsatisfactory as they have many drawbacks.

It has been shown that tea tree oil inhibits certain fungi (See for example Australian Journal of Experimental Agriculture 39:1, 86 -81, 1999). The treatment was satisfactory as it killed the fungi to a large extent, and mainly fungi that attack human, while in plants it caused phytotoxicity to attacked plants.

It was thus desirable to develop a composition adapted to the treatment of a wide range of fungal plant pathogens, e.g., which would not use any of the above known compositions, e.g., mineral oils, detergents and/or fats. However, it may comprise tea tree oil as one of its components. It should be convenient to use and be stable.

SUMMARY OF THE INVENTION

It is thus the core of the invention to provide a cost effective fungicidal emulsion comprising tea tree oil and a water emulsion, wherein the emulsifier is a water solution of a reaction product of a high molecular weight organic fatty acid and an alkali or ammonium compound. Preferably, the emulsion additionally comprising etheric oil. This etheric acid may be selected among lavender oil, pine oil, manuka oil, kanuca oil, eucalyptus oil, bergamot oil, clove oil, lemon oil, lemon grass oil, rosemary oil, geranium oil.

It is in the scope of the present invention wherein the concentration of the tea tree oil is between 0.01% up to 10%, and preferably between 0.1% to 1.5%. It is also in the scope of the present invention wherein the concentration of the tea tree oil is between 0.1% to 1.5%, wherein the concentration of the product is 0.1% to 1% and further wherein the remainder being water.

It is also in the scope of the present invention wherein the alkali and ammonium compounds are selected among sodium, potassium and/or ammonium hydroxides, carbonates, bicarbonates or any mixture thereof. Preferably, the concentration of the additional etheric oils is between 0.01% to 5%.

It is still in the scope of the present invention wherein the acid is selected among; (a) tall oil acids, naftenic acids, rosin acids and any mixture thereof; (b) saturated fatty acid selected among lauric acid, myristic acid, palmitic acid, stearicacid, arahinoic acid, behenic acid, lingocerinicacd or any mixture thereof; and, (c) unsaturated fatty acids selected among decenoic acid, dodecenoic acid, palamitinoleic acid, oleic acid, lonoleic acid, undecelenic acid, sorbic acid, recinoleic acid or any mixture thereof.

DETAILED DESCRIPTION OF THE INVENTION

The following description is provided, alongside all chapters of the present invention, so as to enable any person skilled in the art to make use of said invention and sets forth the best modes contemplated by the inventor of carrying out this invention. Various modifications, however, will remain apparent to those skilled in the art, since the generic principles of the present invention have been defined specifically to provide fungicide compositions containing teat tree oil (hereinafter 'fungicide composition'), and more specifically to provide an effective emulsion containing etheric components obtained from the tea tree, especially adapted for the control of wide range of fungal plant pathogens.

This fungicide composition is a fungicidal emulsion comprising tea tree oil and a water emulsion; wherein the emulsifier is a water solution of a reaction product of a high molecular weight organic fatty acid and an alkali or ammonium compound.

The term 'tea tree' (i.e., TT) is referring hereinafter to *Melaleuca alternifolia* known in the common name "tea tree." More generally, the term is referring to any of the laurel tree family, unusual variety indigenous to the east coast of New South Wales, Australia.

The term 'tea tree oil' (i.e., TTO) is generally referring hereinafter to any water miscible and water immiscible ingredient of the TT. More specifically, the term TTO is referring to terpinen-4-ol type oils consisting chiefly of terpinenes, cymenes, pinenes, terpineols, cineole, sesquiterpenes, and sequiterpene alcohols. The term TTO is also referring to any naturally obtained or chemically synthesized of purified composition comprising terpinen-4-ol oils, 29-45%; γ-terpinene, 10-28%, α-terpinene, 2.7-13%; 1,8,-cineole, 4.5-16.5%, and various terpenes, 1-5% selected yet not limited to α-pinene, limonene, ρ-cymene and terpinolene.

The term 'emulsion' is referring hereinafter to any water in oil (W/O); oil in water (O/W); W/O/W and/or O/W/O phases comprising the TTO inside, outside or at the surface of aggregates, vesicles, micelles, reversed micelles, nano-emulsions, micro-emulsion, liposomes or in any combination thereof.

The term 'emulsifier' is referring hereinafter to any material or molecule provided as a polymer, oligomer or monomer and is nonionic, anionic or cationic detergent and/or surfactant. The emulsifier is preferably comprises of both lypophilic and hydrophilic portions, such as in saturated or non saturated long chain alkyl comprising at least one polar or charged atom.

The terms 'water' and/or 'water solution' are specifically referring hereinafter to water or water solutions, and more generally to any natural or purified, distilled, filtered, de-ionized waters, water suspensions, water-miscible solvents or diluents, water miscible aqueous phase or water-miscible emulsion or any combination thereof.

This fungicide composition consists in a fungicidal emulsion comprising TTO and a water emulsion in which the emulsifier is a water solution of a reaction product of a high molecular weight organic fatty acid and an alkali or ammonium compound.

It is one embodiment of the present invention wherein the aforementioned fungicide composition additionally comprising etheric oils, selected yet not limited to at least one of the group of lavender oil, pine oil, manuka oil, kanuca oil, eucalyptus oil, bergamont oil, clove oil, limonene oil etc.

It is another embodiment of the present invention wherein the aforementioned high molecular weight fatty acid, fatty acids or a mixture of said acids is saturated, unsaturated or comprising a combination of the two, one or all referred hereto in the short term 'high molecular weight fatty acid'.

It is another embodiment of the present invention wherein the aforementioned high molecular weight fatty acid comprising linear or branched alkyl chains of $C > 12$ atoms per molecule. It is in the scope of the present invention wherein those high weight fatty acids are selected in a non-limiting manner from at least one of the following groups:

a. tall oil acids, naftenic acids, rosin acid or any combination thereof;

b. saturated fatty acids selected from the group of lauric acid, myristic acid, palmitic acid, stearic acid, arahinoic acid, behenic acid, lingocerinic acid or any combination thereof;

c. unsaturated fatty acids selected from the group of decenoic acid, dodecenoic acid, palamitinoleic acid, oleic acid, lonoleic acid, undecelenic acid, sorbic acid, recinoleic acid or any combination of thereof.

According to yet another embodiment of the present invention, those acids are treated with alkali hydroxides, carbonates, bicarbonates or any combination thereof to obtain a salt. Additionally or alternatively, the hereto-defined acids are admixed with sodium, potassium or ammonium compounds, e.g., hydroxides, carbonates, bicarbonates or any combination thereof to obtain a salt.

According to yet another embodiment of the present invention, the emulsion comprises from 0.01% to 10%, preferably from 0.1% to 1.5% TTO and from 0.02% to 10%, preferably between 0.1% to 1% of the aforementioned salt, wherein the remainder being water as defined above.

According to yet another embodiment of the present invention, the emulsion additionally comprises of etheric oil. The concentration of said etheric oil is between 0.01% to 5%, preferably 1% to 5%.

According to yet another embodiment of the present invention, the emulsion is prepared by admixing a water solution comprising alkali hydroxide, carbonate or bicarbonate with a liquid solution of organic acid; subsequently admixing a TTO or a TTO-etheric acid mixture. Said admixing step is provided in the manner homogeneous composition is obtained.

Freshly prepared salts solution in water give good emulsification of TTO in a wide concentration range. However, it is possible to use industrially prepared alkali salts of organic acid in powder or in granulated form to dissolve the salt obtained in hot water and to use the received solutions for the emulsification of the TTO.

The TTO containing fungicide composition and especially the fungicide compositions obtained by means of the aforementioned method are characterized with fungicide activity and by significant plants, corps and soil diseases such as those described in table 2 in a non limiting manner:

Table 1 An extractive list of corps pathogens affectively treated by means of the TTO containing fungicide composition according to the present invention.

Pathogen	Disease	Corp
Oomycetes	Downy mildews and Late blight	Grape, cucurbits, tomato, potato
Phytopthora infestans	Late blight	Tomato, potato
Plasmopara viticula	Downy mildews	Grape
Pseudoperonospora cubensis	Downy mildews	Cucurbits
Ascomycetes	Powdery mildews	Grape, cucurbits, tomato, pepper
Uncinula necator		
Spaerotheca fuliginea	Powdery mildews	
Levillula taurica		
Basidiomycetes	Rust diseases	Roses
Tranzschelia discolor	Rust	Prunes, plums, peaches
Fungi imperfecti	Alternaria	Various corps
Alternaria solani	Early blight	Tomato, potato
Alternaria alternata	Leaf and fruit decays and spots	Various corps
Aspergillus niger	Decays and spots	Various corps
Cladosporium spp.	Leaf spots, decays	Various corps, e.g., tomato and apple
Penecillium spp.	Decays	Various corps, e.g., citrus
Penecillium italicum	Decays	
Penecillium digitatum	Decays	
Botrytis cinerea	Fruit rots and decays	Various corps, e.g., vegetables flowers, grapes.
Stemphillium spp.	Leaf spots	Various corps
Trichoderma		Various corps
Fusarium	Decays, rots	Various corps
Rhizoctmia spp.	Decays, rots	Various corps
Helmintho spp.	Decays, rots	Potato

The TTO containing fungicide composition according to the present invention is useful for treating the pathogens located in the flowers, fruits, leaves, roots, tubers, bulbs, etc.

In order to understand the invention and to see how it may be implemented in practice, a plurality of preferred embodiments will now be described, by way of non-limiting example only, with reference to the following examples, wherein all percentages are denoted for weight percents.

Example 1

300 g of naftenic acid are mixed with 160 g of 1 25% solution of NaOH in water for 60 minutes at 70°C. 316 g TTO is admixed to the reaction product obtained by a means of a contentious stirring until full homogenization is obtained. From the composition obtained, which contains 50% TTO, a stable TTO O/W emulsion is prepared by contentiously admixing of water, in the manner an emulsion comprising from 0.001% to 49.9% of oil.

Example 2

Into a 25% water solution of 300 g $KHCO_3$, some 400 g of melted stearic acid is admixed at 75°C for 30 min. Subsequently, a mixture of 500 g of TTO and 200 g of lavender oil is admixed to the alkali admixture until a full homogenization is obtained. From the composition obtained, a stable TTO O/W emulsion comprising from 0.001% to 49.9% of etheric oil is obtained.

Example 3

30 g of Na_2CO_3 were dissolved in 100 g of water at 50°C for 30 min. This solution was admixed with 120 g of tall oil acid, comprising 25% of rosin acid for additional 30 min. The obtained mixture was dissolved in 500 g of TTO until a homogenized solution is obtained. A plurality of stable TTO-containing emulsions was subsequently obtained.

Example 4

280 g of oleic acid was admixed with 85 g of a 20% ammonia solution at 60°C. 400 g of TTO was admixed until a homogenized solution was obtained.

Example 5

30 g of Na_2CO_3 were dissolved in 100 g of water at 50°C for 30 min. This solution was admixed with 120 g of tall oil acid, comprising 25% of rosin acid for additional 30 min. The obtained mixture was dissolved in 250 g of TTO and 250g of pine oil until a homogenized solution is obtained. A plurality of stable TTO-containing emulsions was subsequently obtained.

Example 6

The stable TTO-containing emulsions obtained in examples 1-5 were proved useful for treating the corps against pathogens selected from *Oomycetes; Phytopthora infestans; Plasmopara viticula; Pseudoperonospora cubensis; Ascomycetes; Uncinula necator; Spaerotheca fuliginea; Levillula taurica; Basidiomycetes; Tranzschelia discolor; Fungi imperfecti; Alternaria solani; Alternaria alternata; Aspergillus niger; Cladosporium spp.; Penecillium spp. ; Penecillium italicum; Penecillium digitatum; Botrytis cinerea; Stemphillium spp. ; Trichoderma; Fusarium; Rhizoctomia spp.*, and *Helmintho spp.*

The stable TTO-containing emulsions obtained in examples 1-5 were proved useful for *in vitro* inhibiting spore germination and/or mycelia growth of the fungi. More specifically, the fungicide composition was proved useful prophylactic and local activity in intact plants and detached leaves. Foliar applications of the TTO compositions to field-grown grapevines and melons inhibit downy and powdery mildews development, respectively. The inhibitory effectiveness of TTO compositions makes it well suited for integration into control programs targeted against various diseases in agricultural organic-grown corps and as a replacement of sulfur and/or cupper containing pesticides.

The experiments were performed by one of the following methods:

Spore germination test of downy mildews late blight, Alternata and rust pathogens

Sporangial suspensions were mixed with various concentrations of TTO, which ranges from 0 to about 1%, and 0.1 mL droplets were transferred to depression glass slides (4 slides per each concentration). Slides were incubated in moist Petri dishes at 20°C in darkness for about 8 hours. The percentage of sporangia releasing zoospores and of zoospores producing germ tubes were counted under the microscope.

Effect of germination of conidia of powdery mildews pathogens

TTO was dissolved and admixed with sterile distilled water to give a stock solution of a known concentration. TTO was admixed with pre-autoclaved 1% water agar to give final concentrations of 0%, 0.001%, 0.01%, 0.1% and 1%. Conidia were shaken onto glass slides previously coated with water agar containing TTO. Slides were placed in Petri dishes containing wet filter paper and kept in the dark at 20°C for about 16 hours. The number of germinated conidia was counted under a microscope.

***In vitro* activity of mycelia growth of fungi**

3 mm diameter agar disks bearing the tested fungus were taken from freshly growing colony on potato dextrose agar, 39 g of Difco in 1 liter of distilled water, and placed on freshly amended with various concentrations of TTO in 9 cm diameter Petri dishes. Plates were incubated at 25°C for about 6 days in the dark, and the colony diameter was recorded every two days. Three Petri dishes, each containing three inoculum disks, were used for each treatment concentration. Experimented were carried on in duplicates.

***In vivo* (*in planta*) experiments**

Plants were sprayed with TTO at various concentrations ranges from 0 to 2% on both surfaces, and 24 hours later were inoculated on the lower surface with sporangial suspension of *Plasmopara viticula* (grape downy mildew). The lower surface of each of six to eight attached leaves on each of six plants of each treatment was uniformly sprayed with 2 mL of a sporangial suspension of $4x10^4$ sporangia per mL, delivered from a glass chromatography sprayer. After inoculation, plants were covered with plastic gages, lightly sprayed on the inside with water, and were incubated at 19°C for about 20 hours in

darkness. The plants were then uncovered and kept in a growth chamber for disease development. 9 days after inoculation, disease developed on each leaf of treated plant was evaluated. In some cases, plants were lightly sprayed with water, covered with plastic bags and incubated at 19°C for 24 hours in darkness, to induce sporulation to determine sporangial production. Leaves are bleached and the percent leaf area covered with sporangiophores and sporangia of *P. viticula* sere visually estimated and recorded. The number of sporangia produced per square centimeter of leaf tissue was calculated as described above for leaf disks.

Powdery mildew inoculations

Conidia were shaken onto leaves previously treated with TTO or with water. Plants were incubated in growth-room and percentage of leaf area covered with powdery, mildew was assessed.

Experiments were also performed to evaluate the biological activity of the compositions according to the present invention against fungal pathogens. The experiments were performed with the emulsion of the following composition: oleic acid, 150g; sodium hydroxide, 20g; TTO, 270 g, and water, 100 mL.

Example 7

The controlling effect of the TTO-containing emulsion on powdery mildew by *Spaerotheca fuliginea* in field-grown melon plants was studied:

Table 2 The inhibition of infected leaf area as to a control as function of treatment by TTO-containing emulsions. Analysis was studied at the upper side of the leaf.

Treatment and Concentration (%)	% Inhibition of infected least area as to a control
Control	—
0.25	50.0
0.50	75.5
1.00	84.5

Example 8

The effect of TTO-containing emulsions on the *in vivo* germination of grape powdery mildew pathogens was studied:

Table 3 The inhibition of conidial germination as a function of TTO concentration:

Treatment and Concentration (%)	% Inhibition of conidial germination
Control	—
0.1	100
0.01	96
0.001	63

Example 9

The effect of TTO-containing emulsions on grape downy mildew was studied:

Table 4 The inhibition of infected leaf area as a function of TTO concentration:

Treatment and Concentration (%)	% Inhibition of infected leaf area
Control	—
1.0	100
0.5	100
0.25	99

Example 10

The effect of TTO-containing emulsions on mycelia growth of *Alternaria alternaria* was studied:

Table 5 The inhibition of *A. alternaria* as a function of TTO concentration:

Treatment and Concentration (%)	% Inhibition of infected leaf area
Control	—
0.5	100
0.25	68
0.10	30

It is acknowledged in this respect that TTO-containing compositions are useful fungicides. It controls *S. fuliginea* in field-grown melon plants, inhibits germination of the grape powder mildew fungus *U. necator* in which a concentration of 0.1% completely inhibits germination at concentrations between 0.01% to 0.001% it provided 96% and 63 inhibition, respectively. It was also proven effective in controlling foliar disease on leaves of potted plants, for example by spraying of 0.25% of TTO, a complete inhibition of grape downy mildew was obtained. Lastly, it was also prove effective in inhibiting mycelia growth of various fungi.

CLAIMS

1. A fungicidal emulsion comprising tea tree oil and a water emulsion wherein the emulsifier is a water solution of a reaction product of a high molecular weight organic fatty acid and an alkali or ammonium compound.

2. The emulsion according to claim 1, additionally comprising etheric oil.

3. The emulsion according to claim 2, wherein additional etheric oil is selected among lavender oil, pine oil, manuka oil, kanuca oil, eucalyptus oil, bergamot oil, clove oil, lemon oil, lemon grass oil, rosemary oil, geranium oil.

4. The emulsion according to any of claims 1 –3, wherein the concentration of the tea tree oil is between 0.01% up to 10%.

5. The emulsion according to claim 4, wherein the concentration of the tea tree oil is between 0.1% to 1.5%.

6. The emulsion according to claims 4 or 5, wherein the concentration of the tea tree oil is between 0.1% to 1.5%, wherein the concentration of the product is 0.1% to 1% and further wherein the remainder being water.

7. The emulsion according to any of claims 1 to 6, wherein the alkali and ammonium compounds are selected among sodium, potassium and/or ammonium hydroxides, carbonates, bicarbonates or any mixture thereof.

8. The emulsion according to any of claims 2 to 7, wherein the concentration of the additional etheric oils is between 0.01% to 5%.

9. The emulsion according to any of claims 1 to 8, wherein the acid is selected among;
   a. tall oil acids, naftenic acids, rosin acids and any mixture thereof;

b. saturated fatty acid selected among lauric acid, myristic acid, palmitic acid, stearicacid, arahinoic acid, behenic acid, lingocerinicacd or any mixture thereof; and,

c. unsaturated fatty acids selected among decenoic acid, dodecenoic acid, palamitinoleic acid, oleic acid, lonoleic acid, undecelenic acid, sorbic acid, recinoleic acid or any mixture thereof.

10. The emulsion according to claim 1, substantially as herein described with reference to the examples.

INTERNATIONAL SEARCH REPORT

Internati... ...lication No
PCT/IL 03/00717

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 A01N65/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 A01N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, PAJ, CHEM ABS Data, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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A	WO 02 21926 A (BARRIER BIOTECH LTD ;MORRIS SANDRA (GB); RYAN ROBERT EUGENE (GB)) 21 March 2002 (2002-03-21) page 4, line 14-20 page 5, line 22 - line 32 page 15	1-10

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[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
1 December 2003	16/12/2003

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Form PCT/ISA/210 (second sheet) (July 1992)

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

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